

# PCT COOPERATION TREATY

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## NOTIFICATION OF ELECTION

(PCT Rule 61.2)

From the INTERNATIONAL BUREAU

To:

Assistant Commissioner for Patents  
United States Patent and Trademark  
Office  
Box PCT  
Washington, D.C. 20231  
ETATS-UNIS D'AMERIQUE

in its capacity as elected Office

|  |  |
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| <b>Date of mailing (day/month/year)</b><br>27 April 2000 (27.04.00)            | <b>Applicant's or agent's file reference</b><br>71446 BC/MSH       |
| <b>International application No.</b><br>PCT/DK99/00436                         | <b>Priority date (day/month/year)</b><br>26 August 1998 (26.08.98) |
| <b>International filing date (day/month/year)</b><br>16 August 1999 (16.08.99) |  |
| <b>Applicant</b><br>RASMUSSEN, Knud, Villefrance                               |  |

1. The designated Office is hereby notified of its election made:

☒

in the demand filed with the International Preliminary Examining Authority on:

06 March 2000 (06.03.00)

☐

in a notice effecting later election filed with the International Bureau on:

2. The election ☒ was

☐

was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

|  |  |
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| <b>The International Bureau of WIPO</b><br>34, chemin des Colombettes<br>1211 Geneva 20, Switzerland | <b>Authorized officer</b><br>Nestor Santesso |
| <b>Facsimile No.:</b> (41-22) 740.14.35  | <b>Telephone No.:</b> (41-22) 338.83.38      |

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09/763687

JC02 Rec'd PCT/PT 2 6 FEB 2001

**PATENT APPLICATION**

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

In re the Application of

Knud Villefrance RASMUSSEN

Attn: PCT Branch

Application No. New US National Stage of PCT/DK99/00436

Filed: February 26, 2001

Docket No.: 108596

For: PATTERN CARRIER FOR USE IN TRANSFER PATTERN PRINTING AND  
THE USE OF A NON-CRYSTALLINE SACCHARIDE SYRUP IN A  
DISPERSION FOR COATING A PAPER WEB SO AS TO OBTAIN SUCH A  
PATTERN CARRIER

**SUBMISSION OF THE ANNEXES TO THE  
INTERNATIONAL PRELIMINARY EXAMINATION REPORT**

Director of the U.S. Patent and Trademark Office  
Washington, D.C. 20231

Sir:

Attached hereto are the annexes to the International Preliminary Examination  
Report (Form PCT/IPEA/409). The attached material replaces claim 5.

Respectfully submitted,



James A. Oliff  
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Thomas J. Pardini  
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JAO:TJP/zmc

Date: February 26, 2001

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5. The use of a non-crystallizing saccharide syrup as an ingredient in an aqueous dispersion for coating a paper web in order to obtain a pattern carrier with a surface which can drain off immediately the moistness deriving from the printing dye while said dye remains on the surface together with the carboxymethylcellulose.

REPLACED BY  
ART 34 AADT

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# PATENT COOPERATION TREATY

## PCT

### INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

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|---|---|---|--|
| Applicant's or agent's file reference<br><b>71446 BC/MSH</b>                                    | <b>FOR FURTHER ACTION</b>                                       |   | See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IEA/416) |
| International application No.<br><b>PCT/DK99/00436</b>  | International filing date (day/month/year)<br><b>16/08/1999</b> | Priority date (day/month/year)<br><b>26/08/1998</b> |  |
| International Patent Classification (IPC) or national classification and IPC<br><b>D06P5/24</b> |   |   |  |
| Applicant<br><b>DANSK HK Ltd et al.</b>   |   |   |  |

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.


2. This REPORT consists of a total of 5 sheets, including this cover sheet.

☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

These annexes consist of a total of 1 sheets.

3. This report contains indications relating to the following items:

- I ☒ Basis of the report
- II ☐ Priority
- III ☐ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
- IV ☐ Lack of unity of invention
- V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement
- VI ☐ Certain documents cited
- VII ☐ Certain defects in the international application
- VIII ☐ Certain observations on the international application

|  |  |
|--|--|
| Date of submission of the demand<br><b>06/03/2000</b>  | Date of completion of this report<br><b>21.11.2000</b>                           |
| Name and mailing address of the international preliminary examining authority:<br> <b>European Patent Office<br/>D-80298 Munich<br/>Tel. +49 89 2399 - 0 Tx: 523656 epmu d<br/>Fax: +49 89 2399 - 4465.</b> | Authorized officer<br><br><b>Connor, M</b><br><br>Telephone No. +49 89 2399 8402 |



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/DK99/00436

## I. Basis of the report

1. This report has been drawn on the basis of *(substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments (Rules 70.16 and 70.17).):*

### Description, pages:

1-13 as originally filed

### Claims, No.:

1-4 as originally filed

5 as received on 22/09/2000 with letter of 21/09/2000

### Drawings, sheets:

1/1 as originally filed

2. With regard to the **language**, all the elements marked above were available or furnished to this Authority in the language in which the international application was filed, unless otherwise indicated under this item.

These elements were available or furnished to this Authority in the following language: , which is:

- ☐ the language of a translation furnished for the purposes of the international search (under Rule 23.1(b)).
- ☐ the language of publication of the international application (under Rule 48.3(b)).
- ☐ the language of a translation furnished for the purposes of international preliminary examination (under Rule 55.2 and/or 55.3).

3. With regard to any **nucleotide and/or amino acid sequence** disclosed in the international application, the international preliminary examination was carried out on the basis of the sequence listing:

- ☐ contained in the international application in written form.
- ☐ filed together with the international application in computer readable form.
- ☐ furnished subsequently to this Authority in written form.
- ☐ furnished subsequently to this Authority in computer readable form.
- ☐ The statement that the subsequently furnished written sequence listing does not go beyond the disclosure in the international application as filed has been furnished.
- ☐ The statement that the information recorded in computer readable form is identical to the written sequence listing has been furnished.

4. The amendments have resulted in the cancellation of:



# INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/DK99/00436

- ☐ the description, pages:  
☐ the claims, Nos.:  
☐ the drawings, sheets:

5. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

*(Any replacement sheet containing such amendments must be referred to under item 1 and annexed to this report.)*

6. Additional observations, if necessary:

## V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

### 1. Statement

|                               |      |        |     |
|-------------------------------|------|--------|-----|
| Novelty (N)                   | Yes: | Claims | 1-5 |
|                               | No:  | Claims |     |
| Inventive step (IS)           | Yes: | Claims | 1-4 |
|                               | No:  | Claims | 5   |
| Industrial applicability (IA) | Yes: | Claims | 1-5 |
|                               | No:  | Claims |     |

2. Citations and explanations  
**see separate sheet**

**INTERNATIONAL PRELIMINARY  
EXAMINATION REPORT - SEPARATE SHEET**

International application No. PCT/DK99/00436

**Re Item I**

**Basis of the report**

- 1 The amendments filed by the applicant in its letter dated 21.09.00 are considered to fulfil the requirements of Article 34(2)(b) PCT.

**Re Item V**

**Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement**

- 1 Reference is made to the following document:

D1: Derwent abstract of JP-B-44016135 (DW196800 000pp) (the patent is mentioned in the present application (cf. p. 3) and cited in the search report. A copy of the abstract in English is enclosed herein as appendix).
- 2 The use of a non-crystallising saccharide syrup proposed in claim 5 of the present application cannot be considered as involving an inventive step (Article 33(3) PCT) for the following reasons. D1 discloses the use of mono- and oligo-saccharides in a water solution (e.g., mannose, galactose) as an ingredient in an aqueous dispersion for coating a paper web in order to obtain a pattern carrier with a surface which can drain immediately the moistness deriving from the printing dye while said dye remains on the surface together with the non ionic methylcellulose.
  - 2.1 A water solution containing a saccharide fulfils the feature of "non-crystallising saccharide syrup" called for in claim 5.
  - 2.2 According to the description of the present application (cf. p. 4, ll. 12-17), a coating comprising a carboxy-methylcellulose and a non-crystalline saccharide syrup presents "the feature that it allows an immediate penetration of the moistness from the printing dye while the dye concentrate remains on the surface together with the carboxymethylcellulose". It follows that the paper *per se* of D1, which is coated with a paste comprising a water solution containing a saccharide and a non ionic methylcellulose, implicitly presents this feature too.
  - 2.3 The subject matter of claim 5 of the present application differs from the

disclosure of D1 only in that carboxymethylcellulose is not explicitly mentioned in D1 (note that D1 is an **abstract** of JP-B-44016135, thus yielding limited information). Carboxymethylcellulose, however, is a non ionic methylcellulose as disclosed in D1. In order to consider the choice of this specific non ionic methylcellulose as inventive, an unexpected result must be obtained.

- 2.4 The fact that the **use** of the dye transfer **paper** disclosed in D1 (viz., transfer paper for ceramics) differs from the one described in the present application (viz., transfer paper for textiles) might render the **use** of said **paper** novel and inventive, but such is not the case for the **use** of a "**saccharide syrup** [...]" in an aqueous dispersion [...] for coating a paper web" (cf. claim 5) as long as the prior art transfer paper is **suitable for** "use in the transfer of a colour pattern from the pattern carrier onto a moist textile web by transfer printing" (cf. claim 5 and point V.2.2 supra).

If the paper disclosed in D1 is shown **not** to be suitable for "use in the transfer of a colour pattern from the pattern carrier onto a moist textile web by transfer printing", then claim 5 would be inventive.

- 2.5 Moreover, the applicant's attention is drawn on the fact that the paper carrier coated with the aqueous dispersion as called for in claim 5 does not necessarily show all the features of the pattern carrier which are listed in the characterizing part of claim 1.

In the absence of any evidence in the sense of points 2.3 and 2.4, claim 5 cannot be considered as involving an inventive activity in the sense of Article 33(3) PCT.

11.22.09.00

PCT/DK99/00436

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5. The use of a non-crystallizing saccharide syrup as an ingredient in an aqueous dispersion of carboxymethylcellulose for coating a paper web in order to obtain a pattern carrier, which can be used in the transfer of a colour pattern from the pattern carrier onto a moist textile web by transfer printing, said use providing the pattern carrier with a surface which can drain off immediately the moisture deriving from the printing dye while said dye remains on the surface together with the carboxymethylcellulose.

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INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

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|--|-----------|--|
| <b>(51) International Patent Classification:</b><br>D06P 5/24  | <b>A1</b> | <b>(11) International Publication Number:</b> WO 00/12809<br><b>(43) International Publication Date:</b> 9 March 2000 (09.03.00)   |
| <b>(21) International Application Number:</b> PCT/DK99/00436<br><b>(22) International Filing Date:</b> 16 August 1999 (16.08.99)<br><b>(30) Priority Data:</b><br>PA 1998 01070 26 August 1998 (26.08.98) DK<br><b>(71) Applicant (for all designated States except US):</b> DANSK HK LTD. [CN/CN]; Unit 6 18/F Wah Chun Industrial Centre, 54 Tai Chung Road, Tsuen Wan N.T., Hong Kong (CN).<br><b>(72) Inventor; and</b><br><b>(75) Inventor/Applicant (for US only):</b> RASMUSSEN, Knud, Villefrance [DK/DK]; Gimlesvej 2A, DK-8600 Silkeborg (DK).<br><b>(74) Agent:</b> CHAS. HUDE A/S; H.C. Andersens Boulevard 33, DK-1553 Copenhagen V (DK).   |           | <b>(81) Designated States:</b> AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).<br><br><b>Published</b><br><i>With international search report.<br/>Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i> |
| <b>(54) Title:</b> PATTERN CARRIER FOR USE IN TRANSFER PATTERN PRINTING AND THE USE OF A NON-CRYSTALLINE SACCHARIDE SYRUP IN A DISPERSION FOR COATING A PAPER WEB SO AS TO OBTAIN SUCH A PATTERN CARRIER<br><br><b>(57) Abstract</b><br><p>A pattern carrier for use in transfer pattern printing of textiles comprises paper with an air permeability (Bendtsen-porosity) of more than 500 ml/min and a water absorption corresponding to a Cobb-number of at least 50, said paper being coated with an aqueous dispersion of carboxymethylcellulose containing a non-crystallizing saccharide syrup, preferably in an amount of approximately 30 g of dispersion per m<sup>2</sup>, whereafter one or more colour patterns are printed on said paper, each colour pattern comprising a water-soluble or dispersible dye admixed an easily soluble thickening carrier with a temporary binding effect, preferably in form of carboxymethylcellulose. The use of a saccharide syrup, preferably a sorbitol syrup, for the coating renders it possible to use standard-absorbing crude paper as the basis of the pattern carrier, which provides obvious financial and production-related advantages.</p> |           |  |

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# **FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

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| EE | Estonia                  |    |  |    |  |    |                          |

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## INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 99/00436

## A. CLASSIFICATION OF SUBJECT MATTER

IPC7: D06P 5/24

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)

IPC7: D06P

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

SE,DK,FI,N0 classes as above

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

| Category* | Citation of document, with indication, where appropriate, of the relevant passages  | Relevant to claim No. |
|-----------|---|-----------------------|
| X         | WO 8902950 A1 (DANSK TRANSFERTRYK A/S),<br>6 April 1989 (06.04.89)<br><br>--  | 1-5                   |
| A         | File WPi, Derwent accession no. 1968-32228Q,<br>SHINETSU CHEM IND CO LTD: "Transfer paper ceramic<br>water sol paste"; & JP,B,44016135<br><br>----- | 1-5                   |

☐ Further documents are listed in the continuation of Box C.☒ See patent family annex.

## \* Special categories of cited documents:

- "A" document defining the general state of the art which is not considered to be of particular relevance
- "E" earlier document but published on or after the international filing date
- "L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)
- "O" document referring to an oral disclosure, use, exhibition or other means
- "P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance: the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

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Date of the actual completion of the international search

2 December 1999

Date of mailing of the international search report

19.01.2000

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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/DK 99/00436

| Patent document<br>cited in search report | Publication<br>date | Patent family<br>member(s) | Publication<br>date |
|---|---------------------|----------------------------|---------------------|
| WO 8902950 A1                             | 06/04/89            | AT 91513 T                 | 15/07/93            |
|   |                     | AU 2549988 A               | 18/04/89            |
|   |                     | BG 60568 B                 | 28/08/95            |
|   |                     | DE 3882379 A,T             | 19/08/93            |
|   |                     | DK 84290 A                 | 31/05/90            |
|   |                     | DK 169135 B                | 22/08/94            |
|   |                     | DK 520587 D                | 00/00/00            |
|   |                     | EP 0412084 A,B             | 13/02/91            |
|   |                     | SE 0412084 T3              |                     |
|   |                     | ES 2008624 A               | 16/07/89            |
|   |                     | FI 95157 B,C               | 15/09/95            |
|   |                     | FI 901717 D                | 00/00/00            |
|   |                     | GR 1000269 B               | 12/05/92            |
|   |                     | HK 49694 A                 | 27/05/94            |
|   |                     | HU 65197 A                 | 02/05/94            |
|   |                     | HU 210259 B                | 28/03/95            |
|   |                     | IE 61805 B                 | 30/11/94            |
|   |                     | JP 2925562 B               | 28/07/99            |
|   |                     | JP 3500428 T               | 31/01/91            |
|   |                     | KR 9609575 B               | 20/07/96            |
|   |                     | LT 1575 A                  | 26/06/95            |
|   |                     | LT 3571 B                  | 27/12/95            |
|   |                     | LV 10319 A,B               | 20/10/94            |
|   |                     | MC 2061 A                  | 04/09/90            |
|   |                     | NO 178440 B,C              | 18/12/95            |
|   |                     | OA 9184 A                  | 31/03/92            |
|   |                     | PT 88667 A,B               | 31/07/89            |
|   |                     | RO 111480 A                | 31/10/96            |
|   |                     | RU 2088717 C               | 27/08/97            |
|   |                     | SG 28994 A,G               | 10/06/94            |
|   |                     | US 5196030 A               | 23/03/93            |

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Title: Pattern carrier for use in transfer pattern printing and the use of a non-crystalline saccharide syrup in a dispersion for coating a paper web so as to obtain such a pattern carrier.

### Technical Field

- 5 The present invention relates to a pattern carrier in form of a paper web with a colour pattern printed thereon and to be used in transfer pattern printing of a moist textile web. The invention relates also to the use of a saccharide syrup known per se as an ingredient in a dispersion for coating a paper web so as to obtain a pattern carrier with particular properties.

### 10 Background Art

Transfer pattern printing is a well-known and extensively used technique, which involves a continuous transfer of a pre-printed pattern from a pattern carrier web to a moist textile web, where the two webs are continuously brought into contact with one another in a transfer region which is frequently in the form of one or more pairs  
15 of pressure rollers, cf. the Figure.

In principle various types of the technique have been known since the twenties, but the technique did not become commercially interesting until the late fifties. Various types of transfer printing have been described inter alia in US-PS Nos. 1 651 470 and 1 783 606, FR-PS Nos. 1 034 816 and 1 036 510, DK patent applications Nos.  
20 5666/68 and 1 566/69, SE-PS No. 137 674, GB-PS Nos. 1 430 832 and 1 480 328, US-PS Nos. 1,965,257 and 1,993,524, DE published specification Nos. 2 710 158 and 2 702 300 and US-PS No. 4 057 864. Common to the procedures described in these publications was that it was not possible to obtain acceptable results without involving a heating and/or dyes based on volatile organic solvents. Frequently, useful

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results required the use of so long contact times that it was in fact not a question of continuous printing processes.

Therefore it was a major breakthrough for the transfer printing when the Applicant in the late eighties succeeded in developing a process for transfer pattern printing whereby it was possible simultaneously to avoid the heating and the use of organic solvents. The process is described in DK-PS No. 169 135 and is characterised by a suitable choice of pattern carrier and dye formulations, an accurate control of the moistening of the textile web and the use of a suitably high pressure, whereby particularly good reproducible results can be obtained at rather high processing speeds and, as mentioned, without the use of heating and exclusively by the use of water-based dye formulations. In addition to the production-related advantages and the particularly good product qualities, the process according to DK-PS No. 169 135 also presented obvious environmental and energy-related advantages as well as a substantially improved working environment.

15 This epoch-making process is, however, also subject to limitations. To be more precise this process presents particular requirements to the paper used as pattern carrier because said paper must be of a specific nature in order to be coated with a colour pattern at the desired printing speed. It is necessary to use a paper quality which is only slightly absorbing, and in order to avoid that the various, applied colours become blurred it is necessary to strongly cool the paper web between each application of colour in order to solidify the colour.

The printing of the paper is carried out by means of printing screens as shown in the Figure. Thus the process according to DK-PS No. 169 135 necessitates introduction of cooling rollers not shown between the individual printing screens. The coated paper web is carried around these cooling rollers while subjected to a cooling to below -20°C. In this manner it is possible to prevent the colours applied from various printing screens from being blurred. However, this "freezing" does, of course,

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complicate the entire process significantly and intensifies the costs involved, and accordingly it is desired to provide a pattern carrier where the colours do not become blurred - not even at high printing speeds, and which therefore does not require a cooling between the individual applications of colour.

- 5 Coating a paper surface with a suitably selected substance in order to alter the absorption properties of the paper is per se a well-known process. DE published specification No. 35 04 814 thus discloses a process for transfer pattern printing of a textile web, in which paper coated with for instance carboxymethylcellulose is used as a pattern carrier. DE accepted published specification No. 27 01 392 also discloses
- 10 a process for transfer pattern printing of a textile material. Paper is used as a pattern carrier in this process, said paper being coated with carboxymethylcellulose and the dye being transferred from the pattern carrier to the textile by means of heat and/or pressure.
- 15 It is on the whole well-known to use carboxymethylcellulose as the substance with which a paper surface is coated. According to the above DK patent No 169 135 a pattern carrier of a lightly absorbing, preferably coated paper is thus used, the coating or application being made with carboxymethylcellulose, an alginate or an aqueous dispersion of polyethylene or polyacrylate, preferably carboxymethylcellulose which
- 20 is an easily accessible substance with advantageous properties. However, the carboxymethylcellulose is per se not sufficient to provide standard-absorbing crude paper with the desired absorption properties.

- The use of saccharides in the manufacture of transfer paper has hitherto only been described in JP patent application No 44-16135. However, this application relates to
- 25 a transfer paper for transferring colour patterns to porcelain and ceramics. By adding one or several mono- or oligosaccharides to the water-soluble paste containing a cellulose derivate with which the paper is coated a paper is sought to be obtained which is more easily removed from the porcelain or ceramic object after the pattern

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has been transferred thereto. Furthermore, by using a transfer paper containing such saccharides, a pattern is obtained which retains its clear outlines after baking of the porcelain or ceramic object. The transfer paper according to the Japanese publication must be coated twice, the lower coating consisting of an aqueous solution of the cellulose derivative alone and the upper coating consisting of the same solution to which the chosen saccharide has been added. A water-resistant layer is subsequently applied on top of said layers, said water-resistant layer according to the examples being a 30% acetone solution of acetyl cellulose. This known transfer paper is thus considerably more complicated than the coated paper according to the present invention and is used for a completely different purpose.

#### Brief Description of the Invention

It has now surprisingly been found that it is possible to produce such a pattern carrier from standard-absorbing paper by coating said paper with an aqueous dispersion of carboxymethylcellulose containing a non-crystalline saccharide syrup. This coating presents the unexpected feature that it allows an immediate penetration of the moistness from the printing dye while the dye concentrate remains on the surface together with the carboxymethylcellulose. As a result the paper surface remains dry and the individual colour patterns do not become blurred. These colour patterns can be easily removed again from the paper during the subsequent transfer printing.

20 The invention relates therefore to a pattern carrier in form of a paper web with a colour pattern printed thereon to be used in transfer pattern printing of a moist textile web by a compressing of the two webs between one or more pairs of rollers without the use of heat, but under such a linear pressure that the textile web is subjected over a short length to a compressing into a reduced thickness followed by a natural expansion, whereby the colour pattern is absorbed from the pattern carrier into the textile web, and the pattern carrier according to the invention is characterised in that it is made of paper with an air permeability (Bendtsen-porosity) of more than 500 ml/min,

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measured according to the standard DIN 53120 T1, and a water absorption corresponding to a Cobb-number measured according to the standard SCAN-P12:64, Cobb<sub>60</sub>, of at least 50, said paper being coated with an aqueous dispersion of carboxymethylcellulose containing a non-crystalline saccharide syrup, preferably in an amount of approximately 30 g of dispersion per m<sup>2</sup>, whereafter one or more colour patterns are printed on said paper, each colour pattern comprising a water-soluble or dispersible dye admixed an easily soluble thickening carrier with a temporary binding effect, preferably in form of carboxymethylcellulose.

- 10 The ingredient of the dispersion providing the paper web with surprising and useful properties is a non-crystalline saccharide syrup, which is preferably a sorbitol syrup. Such products are conventionally used within the food industry, whereas the use thereof for coating ordinary paper is less widely known. The products have thus never been used for coating of ordinary paper which subsequently are used as pattern carriers in connection with transfer printing on textiles.

Therefore the invention also relates to the use of a non-crystallizing saccharide syrup as an ingredient in an aqueous dispersion for coating a paper web in order to obtain a pattern carrier with a surface which can drain off immediately the moistness deriving from the printing dye while said dye remains on the surface together with the carboxymethylcellulose.

The invention presents several obvious advantages. First of all the choice of paper for the pattern carrier is far less critical than previously because it is possible to use ordinary standard-absorbing crude paper which is considerably less expensive than the paper hitherto used. Moreover, the coated paper according to the invention facilitates the printing thereon of the colour pattern. No skilled work is involved and accordingly no particular training of the employees is required, whereby the printing of the colour pattern on the coated paper to a far higher degree than previously can be carried out locally. The consumption of dye is of the same magnitude as the

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consumption related to the hitherto used paper, but the wastage rate is significantly lower than previously especially in connection with transfer printing on cellulose fibres and other natural fibres. The ready printed paper can be used in the same manner as previously, viz. by the same process and in the same machines as described in DK-PS No. 169 135. As a result the same advantages as at the process according to DK patent No. 169 135 are obtained, viz. transfer printing on textiles carried out at a high production rate without use of volatile solvents and without heating while using standard-absorbing crude paper as pattern carrier, any form of drying or cooling between each printing screen being rendered superfluous when printing the pattern carrier.

The selected crude paper is coated in a covering layer with the aqueous dispersion of carboxymethylcellulose comprising the non-crystalline saccharide syrup, preferably in an amount of approximately 30 g of dispersion per m<sup>2</sup> of paper surface. A typical dispersion presents the following composition (by weight):

- |    |     |   |
|----|-----|---|
| 15 | 68% | of water                                |
|    | 20% | of saccharide syrup                     |
|    | 12% | of carboxymethylcellulose (dry weight). |

It is possible to add a light dye pigment in order to allow a visual evaluation of whether the coating is covering or not.

- 20 The paper is coated on the printing side thereof by means of a screen roller. It is also possible to carry out the coating "on-line" in the same cycle of operations on the paper producing machine when the crude paper is produced. The coated paper is subsequently subjected to a printing by passing a number of printing screens (A,B, C,D, ...), cf. the Figure, whereby the desired colour pattern is printed thereon by means of a screen for each colour. The particular nature of the coating implies that
- 25 the applied colour dries up immediately with the result that the paper can be ad-

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vanced directly from one screen to the next screen without requiring intermediate drying or freezing. The printing is usually carried out at a paper rate of 60-80 m per minute, ie about 1 m/sec. Even though this rate is fairly high, according to the invention the printing of the paper proceeds without any problems, as the surface dries up and the colour solidifies so quickly (within less than one second) that the paper surface immediately after passing screen A and long before passing screen B is completely dry etc. When the desired colour pattern has been obtained after passing the last printing screen (D on the Figure), the printed paper is subjected to a final drying and then wound up on a roller.

- 10 The transfer printing per se on a textile web is carried out in a manner known per se by said textile web after moistening thereof in an alkaline bath and a controlled compressing so as to obtain a specific moistness being joined with the printed paper web between one or more pairs of pressing rollers at a suitably high pressure. Finally, the colour printed on the textile web is fixed in a manner known per se, and
- 15 the used pattern carrier is re-circulated so as to allow a reuse of the paper.

The saccharide syrup used is preferably based on sorbitol, but other sugars such as glucose, fructose, mannose, galactose, arabinose, xylose, ribose and the like can also be used. A particularly preferred saccharide syrup is the product "Sorbidex 200" from the company Cerestar. This product comprises predominantly sorbitol, but

20 comprises also small amounts of mannitol (approximately 1.1 %) and reducing sugars (approximately 0.1 %).

The aqueous dispersion comprises also a carboxymethylcellulose. This carboxymethylcellulose can for instance be "Ambergum®1221", which is a water-soluble, anionic cellulose polymer from the company Aqualon. This product is also suited as

25 ingredient in the printing colour formulations.

The new pattern carrier according to the invention is particularly suited for use in

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transfer printing on cellulose fibres and other natural fibres by the process according to DK-PS No. 169 135. In principle, patterns of any water-soluble or water-dispersible dye, such as substantive dyes, cationic dyes, chromium-complex dyes, reactive dyes and pigments can be printed on the pattern carrier according to the invention.

- 5 Among these dyes, the reactive dyes are particularly preferred.

In addition, the pattern carrier according to the invention can be used for printing of dispersion dyes on webs of synthetic fibres. A colour pattern can also be printed on the pattern carrier according to the invention by way of "inkjet"-printing, and a pattern of acid dyes can also be printed thereon.

- 10 The invention is illustrated in greater detail by means of the following Examples:

### EXAMPLES

- The following examples involve the use of a machine-glazed base paper of the brand "Transferroto Classico" type 814 from the company Cham Tenero. This paper has a weight of a thousand grains indicated in grammes of 65.0 g/m<sup>2</sup>, a
- 15 "Bendtsen-porosity" (air permeability) of 700 ml/min, measured according to the standard DIN 53120 T1, a water absorption corresponding to a Cobb-number of 55.5 measured according to the standard SCAN-P12:64, Cobb<sub>60</sub>, a relative wet strength of 9.5% and an ultimate strength of 63.6 N/15 mm measured according to the standard DIN EN ISO 1924-2.

- 20 The paper is coated on the printing side with an aqueous dispersion comprising:

83.4 kg "Sorbidex 200" and

50.0 kg "Ambergum®1221" carboxymethylcellulose (CMC)

stirred in 283.6 kg of water. For the toning of the dispersion it is possible to add, if

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desired, 1.25 kg of the dyes Pigmatex red and Pigmatex yellow (half of each) in order to visualize the coating.

### Example 1

A two-coloured pattern is applied onto a textile web of cellulose fibres (viscose and  
5 cotton). The textile is pre-treated in an ordinary way before the printing: It must be completely clean, and if it tends to roll at the rims it must be glued along said rims.

The two colour patterns are printed on the coated paper on a Stork RT printing machine by means of cylindric screens. The two paste recipes are as follows:

#### Recipe 1:

|    |                                     |        |
|----|-------------------------------------|--------|
| 10 | Reactive dye (Rematrans Rot 358)    | 100 g  |
|    | Natural thickener (Na-CMC)          | 120 g  |
|    | Synthetic thickener (Alcoprint RTA) | 6.8 g  |
|    | Anti-foaming agent (Alcopol o 60%)  | 1.1 g  |
|    | Complexing agent (Ladquest 1097)    | 11 g   |
| 15 | Demineralized water up to           | 1000 g |

#### Recipe 2:

|    |                                     |        |
|----|-------------------------------------|--------|
|    | Reactive dye (Rematrans Blau 257)   | 200 g  |
|    | Natural thickener (Na-CMC)          | 120 g  |
|    | Synthetic thickener (Alcoprint RTA) | 6.8 g  |
| 20 | Anti-foaming agent (Alcopol o 60%)  | 1.1 g  |
|    | Complexing agent (Ladquest 1097)    | 11 g   |
|    | Demineralized water up to           | 1000 g |

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The two-coloured pattern is transferred from the paper web to the textile web on a "Cotton Art" standard machine, said textile web being moistened in advance by means of a mixture of

|   |                                   |         |
|---|-----------------------------------|---------|
|   | NaOH, 34° Bé                      | 50 g/l  |
| 5 | Sodium silicate, 36° Bé           | 100 g/l |
|   | Complexing agent (Ladiquest 1097) | 1 g/l   |
|   | Demineralized water up to         | 1 l     |

The fluid absorption in the textile web is approximately 65%.

The dye is fixed on the textile in a manner known per se by way of the  
10 "Cold-pad-batch"-process.

#### Example 2

The same textile web and the same pretreatment are used as in Example 1.

A multicoloured pattern is printed on the coated paper in an "Ink Jet Printer" total  
width machine (width 140 to 180 cm). Concentrated colours of the brand Rematrans  
15 are used in the machine, preferably:

|    |           |              |
|----|-----------|--------------|
|    | Rematrans | Gelb 089     |
| -  |           | Goldgelb 070 |
| -  |           | Orange 035   |
| -  |           | Rot 004      |
| 20 | -         | Rot 358      |
| -  |           | Blau 267     |
| -  |           | Blau 257     |
| -  |           | Türkis 216   |

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- Grün 201

- Schwarz 288

- Schwarz 263

- Schwarz 258

- 5 The paper with the colour pattern printed thereon is used for transfer printing of the textile web as described in Example 1, whereafter the colour is fixed on the textile as described in Example 1.

### Example 3

- 10 A two-coloured pattern is applied onto a textile web of polyamide which has been subjected to an ordinary pretreatment.

The two colour patterns are printed on the coated paper on a Stork RT printing machine by means of cylindric screens. The two paste recipes are as follows:

#### Recipe 1:

|    |                            |        |
|----|----------------------------|--------|
|    | Acid dye (Erionyl Blau)    | 300 g  |
| 15 | Natural thickener (Na-CMC) | 150 g  |
|    | Complexing agent           | 10 g   |
|    | Demineralized water up to  | 1000 g |

An adjustment is carried out to pH 8 by means of NaOH.

#### Recipe 2:

|    |                             |       |
|----|-----------------------------|-------|
| 20 | Acid dye (Erionyl Bordeaux) | 400 g |
|    | Natural thickener (Na-CMC)  | 100 g |

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Complexing agent 10 g  
Demineralized water up to 1000 g

An adjustment is carried out to pH 8 by means of NaOH.

- 5 The two-coloured pattern is transferred from the paper web to the textile web on a "Cotton Art" standard machine, said textile web being moistened in advance in a fluid bath of the following composition:

Natural thickener (Na-CMC) 5 g  
Demineralized water up to 1000 g

An adjustment is carried out by means of an acid/buffer to pH 3.

- 10 The fluid absorption in the textile web is approximately 45%.

The dye is fixed on the textile by way of the "Cold-pad-batch"-process.

#### Example 4

A three-coloured pattern is applied onto a textile web of polyester, which has been subjected to an ordinary pretreatment.

- 15 The three colour patterns are printed on the coated paper on a Stork RT printing machine by means of cylindric screens. The three paste recipes are as follows:

#### Recipe 1:

Teraprint Rot 5 g (dispersion dye) 100 g  
Lyoprint TFA 27 g

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|                   |      |
|-------------------|------|
| Lyoprint AP       | 7 g  |
| Lyoprint BS Conc. | 90 g |
| NaOH              | 5 g  |

Recipe 2:

|   |                                   |       |
|---|-----------------------------------|-------|
| 5 | Teraprint Gelb G (dispersion dye) | 100 g |
|   | Lyoprint TFA                      | 27 g  |
|   | Lyoprint AP                       | 7 g   |
|   | Lyoprint BS Conc.                 | 90 g  |
|   | NaOH                              | 5 g   |

10 Recipe 3:

|    |                                    |       |
|----|------------------------------------|-------|
|    | Teraprint Blau 6R (dispersion dye) | 100 g |
|    | Lyoprint TFA                       | 27 g  |
|    | Lyoprint AP                        | 7 g   |
|    | Lyoprint BS Conc.                  | 90 g  |
| 15 | NaOH                               | 5 g   |

The colour pattern is transferred from the paper web to the textile web on a Lemaire HTP standard machine for transfer printing. The machine is set at 215°C, and a contact time of 25 sec. is used.

Here it is a question of a dry process. The colour has been fixed when the textile  
20 leaves the machine.

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Claims.

1. A pattern carrier in form of a paper web with a colour pattern printed thereon to be used in transfer pattern printing of a moist textile web by a compressing of the two webs between one or more pairs of rollers without the use of heat, but under such a linear pressure that the textile web is subjected over a short length to a compressing into a reduced thickness followed by a natural expansion, whereby the colour pattern is absorbed from the pattern carrier into the textile web, characterised in that the pattern carrier is made of paper with an air permeability (Bendtsen-porosity) of more than 500 ml/min, measured according to the standard DIN 53120-T1, and a water absorption corresponding to a Cobb-number, measured according to the standard SCAN-P12:64, Cobb<sub>60</sub>, of at least 50, said paper being coated with an aqueous dispersion of carboxymethylcellulose containing a non-crystalline saccharide syrup, preferably in an amount of approximately 30 g of dispersion per m<sup>2</sup>, whereafter one or more colour patterns are printed on said paper, each colour pattern comprising a water-soluble or dispersible dye admixed with an easily soluble thickening carrier with a temporary binding effect, preferably in form of carboxymethylcellulose.
2. A pattern carrier according to claim 1, characterised in that the saccharide syrup used comprises sorbitol as main ingredient.
3. A pattern carrier according to claim 2, characterised in that the saccharide syrup used in addition to sorbitol comprises small amounts of mannitol and reducing sugars.
4. A pattern carrier according to claim 3, characterised in that the saccharide syrup used represents approximately 20% by weight of the dispersion.

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5. The use of a non-crystallizing saccharide syrup as an ingredient in an aqueous dispersion of carboxymethylcellulose for coating a paper web in order to obtain a pattern carrier, which can be used in the transfer of a colour pattern from the pattern carrier onto a moist textile web by transfer printing, said use providing the pattern carrier with a surface which can drain off immediately the moisture deriving from the printing dye while said dye remains on the surface together with the carboxymethylcellulose.

*method claim*

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